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FOSSIL GRASSES AND SEDGES.[1]

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IN number of species the Glumales (Graminales, Poales) is one of the greatest angiospermous alliances. Aside from the forms known as weeds or the cultivated species which have been generally distributed by commerce and colonization, the group is cosmopolitan, with common species in the northern and southern as well as the eastern and western hemispheres. The distribution is very uniform, no one tribe or large genus being confined to a single geographic area, abundant proof in itself that the Glumales are an old type, whose generic evolution occurred far back in geological history.

The known geological record does not, however, throw much light on this subject. From the nature of the case the most we can expect of fossil grasses and sedges is that they will give us some idea when these types first appeared on the globe and when they became abundant and widespread. We cannot expect to unravel the botanical affinities of stray bits of leaf or indefinite remains of inflorescence (Panicum), culms (Culmites), or rhizomes (Rhizocaulon) in plants whose leaf-form and general struc-

[1] Published by permission of the Maryland Geological Survey.

ture is so uniform; nor can the names bestowed upon these remains be taken to indicate relationship with the modern forms except in a most generalized sense, indicating rather the personal preference or convenience of their describers. However, as organic remains of frequent occurrence and definite character they deserve a place in fossil floras, and are perhaps more useful to the geologist than to the botanist.

Summarizing the described species, we may note that we have no evidence of grasses nor of sedges during the Paleozoic. When parallel-veined leaves were supposed to indicate exclusively Monocotyledonous character a number of supposed forms were described from the Carboniferous. These have since been found to be Calamarian or Sigillarian leaves. The remains from the older Mesozoic show little improvement in definiteness. We would expect grasses to have existed, and in fact a score of species have been described from the Jurassic (Poacites, Bambusium, etc.). Saporta in particular has described numerous species of grass-like or sedge-like leaves under the name Poacites.[1]

The Cretaceous seems to have been very poorly provided with sedges, if we may judge from the fossils, chiefly described under the name Cyperacites; the grasses, however, are quite numerous during this period (Arundo, Phragmites, Culmites, Poacites, etc.). With the ushering in of the Tertiary, both grasses and sedges become more common, upward of two score species of each type having been described from the Eocene. It is in the Miocene, however, that the greatest display of fossil grasses and sedges is made, there being numerous species founded on culms, glumes, inflorescence, rhizomes, and leaves (Carex, Cyperus, Cyperites, Cyperacites, Oryza, Panicum, Arundo, Arundinites, Phragmites, Bambusa, Uniola, Palæo-Avena, etc.).

Referring more specifically to the Cyperaceæ, it may be noted that the middle and lower Cretaceous of this country, which include the abundant, plant-bearing Potomac beds (Fontaine), the Dakota group (Lesquereux), and the Raritan (Newberry,

[1] As a matter of fact, Poacites as characterized by Brongniart in 1822 was monotypic, and his species having been relegated to synonymy, the name is not available for the Mesozoic species.

Hollick) do not show any recognizable remains of sedges. Dawson has described one doubtful form from the lower Cretaceous (Urgonian) of British Columbia, and Heer has described two species founded on rather more definite remains of leaves from the Kome beds (Urgonian) of Greenland. This paucity of remains renders the discovery of the following species of some importance, as it was evidently abundant in the Atlantic coastal plain at a time when those transition beds between the typical Raritan and the typical Matawan were being laid down.

Carex clarkii sp. nov. (Fig. 1.)

Remains consist of fragments of leaves up to 6 cm. in length, and varying in width from 1.5 to 4 mm., averaging between 2

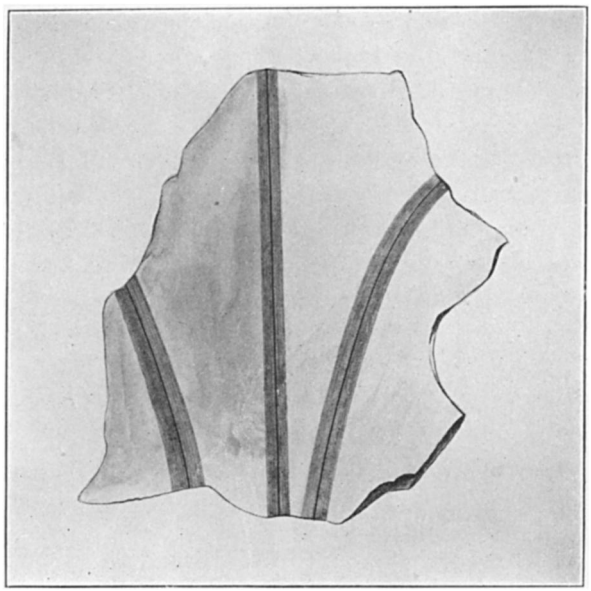

FIG. 1. — Specimen of *Carex clarkii* from Grove Point, Maryland.

and 3 mm. in the specimens collected. Leaves slightly keeled, evidently becoming somewhat thicker and narrower toward the base. Midrib moderately prominent, lateral veins very fine and scarcely discernible, except in the larger specimens.

The type material was collected originally by Dr. Wm. Bullock Clark at Grove Point, Maryland. Similar material has been collected in a different leaf-bed on Grove Point by Bibbins and Berry, who also collected it in less abundance at the Deep Cut of the Chesapeake and Delaware Canal in Delaware. In overhauling my collections from Cliffwood, N. J., I found three small fragments, hitherto undescribed, which are identical with the specimens from further south. I now have twenty-two specimens of this form from the Grove Point locality, five from Deep Cut, and three from Cliffwood. Five specimens were recently collected by the writer from the west bank of Cheesequake Creek one-half mile southwest from Morgan Station.

It has seemed best not to press the comparison with other species from widely different geological horizons too closely. Our species might readily enough be correlated with almost any of the thirty-nine species of Cyperaceæ which Heer describes from the Miocene of Switzerland, and the resemblance is also very close to some of the leaves which Saporta refers to Poacites (*e. g.*, *P. antiquior*, *tenellus*, *cercalinus*). So much confusion results from identifying as common, forms widely separated, either geologically or geographically, when the determinations are based upon any but the most complete material, that it has seemed best to describe the American remains as a new species, as I have no doubt it really is.

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